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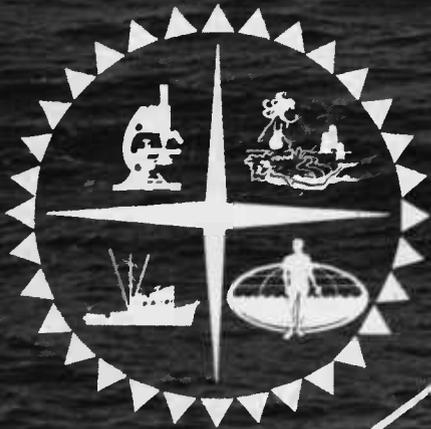
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Oregon State University Extension **MARINE ADVISORY PROGRAM** Economics of Hatchery Salmon Disposal in Oregon

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Economics of Surplus Hatchery Salmon Disposal in Oregon

by
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Acknowledgments

The following report was indirectly initiated by individuals concerned with the disposal of salmon returning to Oregon hatcheries. Appreciation is expressed to these individuals as well as those called upon to provide information included in the report. In particular, the successful bidders for the Fish Commission of Oregon (FCO) hatchery salmon for the period 1968-71 are to be commended; each of the successful bidders was interviewed. Cooperation was 100 percent, all successful bidders devoted the time necessary to provide the information requested. The Fish Commission of Oregon provided information and assistance without which the report would have been incomplete. The knowledge and information provided to the author by bidders and the FCO has proved to be invaluable.

Economics of Surplus Hatchery Salmon Disposal in Oregon

by Ken Roberts

"Salmon sold from hatcheries is of poor quality; this hurts our markets!"

"A public agency shouldn't be in the fish business!"

"Those returned hatchery fish are lowering the price of salmon caught by commercial fishermen!"

Every year when salmon season begins, these comments and others are voiced by many fishermen and processors. The salmon they talk about are being sold by the Fish Commission of Oregon (FCO). Many of the people interested in the hatchery salmon disposal program base their comments each year on "hunches" or "grapevine" information. The purpose of this report is to provide material that can be used to make decisions or form educated opinions by those concerned with this perennial issue. Since the FCO is using a bid program, the buyers of the salmon change from year to year. This means information should be collected for several years to get a good picture of the situation. For this reason the information was collected for the 1968-71 period. Few conclusions will be presented; the purpose is to provide information which you can use to answer your questions. In order to help understand this material and the current issue, let's take a look at the history of the situation.

In the early years of the state of Oregon, salmon were naturally plentiful. As "progress" came to Oregon, natural resources were used in many ways, some of which would lead to results not fully apparent for generations. Oregon was originally viewed as a supplier of raw materials needed for economic growth. Tress were cut from mountains in ways that often resulted in destruction of natural salmon spawning areas. Dams and irrigation systems

were also constructed with little regard for the salmon. As one important consequence, spawning areas for natural runs of salmon, steelhead, and other fish were reduced. Another adverse factor was that salmon were overfished on many occasions before conservation practices were adopted. For years now, federal and state agencies have been working to artificially replace the salmon runs lost when natural habitats were destroyed. They have undertaken massive efforts to provide the salmon ways to get around dams and other structures. Salmon hatcheries have been developed and improved. The hatcheries have been successful in providing a large portion of the salmon harvested by growing numbers of commercial and sport fishermen.

Just as the number of fishermen has increased, so has the number of salmon produced by the hatcheries in Oregon. Prior to 1963 the increase in hatchery salmon presented no problem. All salmon returning to the hatcheries were sources for eggs and sperm needed in the expanding hatchery program. In 1964, the situation changed. More fish returned to the hatcheries than were needed to supply eggs and sperm. That has been the case each year since 1964 and the FCO has had to determine means of disposing of the fish.

Disposal of Hatchery Fish

Although the current controversy began in 1964, returned hatchery salmon were being disposed of before then. Recall that until 1964 all the salmon were utilized for egg production. The spawned out fish were given to state institutions, to Indians, or they were buried. Some of these fish may then have been sold, but most were not marketed. In 1964 salmon returned to hatcheries in numbers exceeding those needed for egg production. At that time the FCO began an orderly disposal program. Every effort was made to use the salmon in a beneficial manner. In those early years, the FCO kept

most of the salmon out of the market. Adult coho were transferred to streams with unused spawning areas. Other methods included the release of unfed fry, passage of adult coho to areas above hatcheries and the taking of eggs for shipment to other states. Salmon were also distributed to the Indians as well as to state agencies through Oregon's Department of General Services before they were put up for bid.

The fish up for bid in 1964 and succeeding years have been those that are actually "surplus". Prior to the 1971 run, fish sold as surplus were allowed to be utilized as the buyer saw fit. Complaints from people in the commercial salmon business during 1969 and 1970 resulted in several meetings between industry representatives and FCO personnel. People in the industry were concerned that surplus fish were being used by some buyers in ways that would harm the market. In 1971 FCO began a grading program for the hatchery salmon. FCO hatchery personnel placed the salmon in one of three grades: #1 salmon were judged to be in excellent condition, no restrictions were placed on their use; #2 salmon were judged to be in reasonably good condition and could not be used as fresh or fresh frozen; #3 salmon were judged to be in poor condition and restricted to use for non-human consumption. The effect of hatchery salmon sales on commercial prices also was of concern. Unfortunately, people concerned with the situation have had little information from which to determine if complaints were valid.

Marketing Oregon Hatchery Salmon

Commercial Versus Hatchery Sales

The three typical quotations at the beginning of this report indicate that people in Oregon's seafood industry view the surplus salmon topic as one of commercial *versus* hatchery sales. Information on the relationship of

commercial and hatchery sales as well as marketing is needed to explain the economics of the situation. Marketing information will be presented later in the report. Table 1 can be used to see the relationship between commercial and hatchery sales. Hatchery sales between 1968 and 1971 ranged between 4.7 and 6.5 percent of commercial landings. Though the poundage of hatchery fish increased in the period, so has the poundage of commercially caught salmon. The yearly comparison indicates that when commercial fishermen experience a big run the pounds of hatchery fish sold also increases. However, no trend is evident; that is, hatchery fish sales as percent of commercial landings do not seem to be increasing or decreasing.

Table 1. Pounds of Salmon Landed in Oregon Compared to Pounds Sold from FCO Hatcheries, 1968-71.

Year	lbs. Landed Commercial	lbs. Sold Hatcheries ^{1/}	Hatchery lbs. as % of Commercial lbs.
1968	9,990,635	647,448	6.5
1969	10,932,020	625,645	5.7
1970	19,624,008	1,218,746	6.2
1971 ^{2/}	17,330,000	819,219	4.7

^{1/} Estimated by FCO.

^{2/} Data through November, 1971.

Source: Fish Commission of Oregon.

Estimating Hatchery Fish Poundage

Neither FCO nor fish buyers have records of poundage that are both fully complete and accurate. The FCO estimates the weight of the fish since the facilities, manpower, and time to accomplish weighing is not available at the

hatcheries. Weights are estimated on the basis of 8 pounds per adult coho, 12 pounds per adult chinook and 3 pounds for immature salmon (jacks). Buyers weigh the fish they buy but records are not complete. Therefore, it is necessary to choose which figures to use for the remainder of the report. Table 2 shows the poundage reported by FCO and buyers. The biggest difference in the figures appears in 1968 and 1969. This is not surprising. Those years were the most distant and, when the buyer's records were not complete, the buyer was asked for educated guesses. For 1970 and 1971 the figures are much closer. The FCO's estimates appear to be conservative, but not overly conservative. Because FCO estimates appear to be as complete and accurate as possible, these figures will be used to represent the poundage of hatchery salmon in forthcoming tables.

Buyer Utilization

During interviews, buyers were asked to specify the form in which the surplus fish were marketed. An effort was made to determine the uses of coho and chinook separately. Information was obtained on six uses, three for human consumption and three for non-human. Salmon destined for human consumption was considered to have been used for the fresh market, for canning, or for smoking. Salmon destined for non-human consumption was considered to be used as animal food, as crab bait, or as waste for rendering.

The comparison of coho and chinook utilization is presented in Table 3. The figures for coho indicate that 1970 was a year of change. Prior to 1970 the coho sold at hatcheries were used primarily for canning. Beginning in 1970 coho began to penetrate the fresh market while the canning of coho dropped sharply. The smoked or kippered classification had not received much coho prior to 1971. In that year 21 percent of the coho were smoked or kippered. No other significant changes are indicated by the figures.

Table 2. Comparison of FCO and Buyer Estimated Pounds of Fish Sold, 1968-71

	FCO estimate ^{1/}	Buyer estimate ^{2/}
	-- lbs. --	-- lbs. --
1968		
Coho	458,212	346,103
Chinook	186,993	148,916
TOTAL	645,205	495,019
1969		
Coho	347,425	293,800
Chinook	268,482	268,884
TOTAL	615,907	562,684
1970		
Coho	888,281	921,254
Chinook	330,465	372,458
TOTAL	1,218,746	1,293,712
1971 ^{3/}		
Coho	480,948	437,830
Chinook	338,271	414,060
TOTAL	819,219	851,890

^{1/} FCO estimates are based on 8 pounds for each adult coho, 12 pounds for adult chinook and 3 pounds for all jacks.

^{2/} Buyer estimates are based on shipping weights and personal opinion.

^{3/} Data through November, 1971.

Table 3. Utilization of FCO Hatchery Sold Salmon, 1968-71

Uses	1968		1969		1970		1971 ^{1/}	
	<u>Pounds</u>	<u>Percent</u>	<u>Pounds</u>	<u>Percent</u>	<u>Pounds</u>	<u>Percent</u>	<u>Pounds</u>	<u>Percent</u>
Coho								
Fresh market	917	.2	1,042	.3	379,296	42.7	149,575	31.1
Canned	303,336	66.2	277,940	80.0	277,144	31.2	55,790	11.6
Smoked or kippered	7,331	1.6	1,390	.4	14,212	1.6	102,442	21.3
Animal food	0	-	44,470	12.8	108,370	12.2	69,737	14.5
Crab bait	50,403	11.0	22,583	6.5	63,957	7.2	46,652	9.7
Rendered or dumped	96,225	21.0	0	-	45,302	5.1	56,752	11.8
Sub-total	458,212	100.0	347,425	100.0	888,281	100.0	480,948	
Chinook								
Fresh market	187	.1	537	.2	57,170	17.3	4,736	1.4
Canned	107,147	57.3	213,980	79.7	179,773	54.4	5,074	1.5
Smoked or kippered	0	-	11,276	4.2	14,210	4.3	198,565	58.7
Animal food	0	-	0	-	20,158	6.1	114,674	33.9
Crab bait	9,911	5.3	38,930	14.5	50,892	15.4	338	.1
Rendered or dumped	69,748	37.3	3,759	1.4	8,262	2.5	14,884	4.4
Sub-total	186,993	100.0	268,482	100.0	330,465	100.0	338,271	
TOTAL	645,205		615,907		1,218,746		819,219	

^{1/} Data through November, 1971.

It can be noted that the animal food class has received a reasonably stable percentage of the hatchery coho. Coho used for crab bait has also been without major change during 1968-71. Despite FCO efforts to handle the returned salmon in the best possible manner, some of the coho are suitable only for disposal at dumps or rendering plants. This is so because some of the fish are in poor condition when they arrive at the hatchery.

Disposal figures for chinook are similar to coho, though not stated as clearly. In only one year, 1970, were the chinooks able to be fresh marketed in quantity. The reason for this was the successful development of east coast and California markets that year by means of air freight. The percentage canned dropped somewhat in 1970 and drastically in 1971. The chinook followed the big 1971 coho move to the smoked class. More than a third of the chinook were ground for pet or mink food in 1971, a significant change from previous years.

It would be interesting to know if the percentages of coho, chinook, and the two together used for human consumption have changed during the period. Table 3 will give an answer, but for clarity the information has been reorganized into Table 4. The figures do not point out any obvious trends or changes. Thus, the pivotal year of 1970 in the coho utilization of more fresh marketing and less canning tended to offset each other. This seems to indicate that the increased number of fish used in the fresh market were drawn out of other use classes serving human needs. In fact, the total use of hatchery salmon for human purposes was declining in 1970 and continued to decline in 1971. Table 4 also indicates that 1969 was the year of heaviest utilization for human consumption. It was in 1969 that people in the salmon industry were voicing numerous complaints about the sale of hatchery salmon.

A table of figures as extensive as Table 3 often hides some information.

Table 4. Human and Non-Human Use of FCO Hatchery Sold Salmon, 1968-71

	1968	1969	1970	1971
	<u>percent</u>	<u>percent</u>	<u>percent</u>	<u>percent</u>
Coho				
Human	68.0	80.7	75.5	64.0
Non-human	32.0	19.3	24.5	36.0
Chinook				
Human	57.4	84.1	76.0	61.6
Non-human	42.6	15.9	24.0	38.4
Combined				
Human	64.9	82.2	75.6	63.0
Non-human	35.1	17.8	24.4	37.0

For this reason the same material is presented in Figure 1. A small difference between the percentages in Table 3 and Figure 1 may be spotted by a careful reader. The differences, although slight, are the result of rounding errors.

Destination of the Salmon

Oregon is a surplus producer of seafood. Commercially caught salmon and other seafood landed in Oregon is primarily destined for markets outside the state. This means that both national and international markets have been developed for Oregon seafood. Are hatchery fish used locally or do they also reach national and international markets? Comments are often made by people in the seafood industry concerning the poor quality of hatchery-sold salmon. It takes a fish of good quality to reach out-of-state markets, particularly if it is marketed in fresh form. If the comments are true, it would mean only small quantities of hatchery fish could be marketed out-of-state, unless, of course, the seller wishes to risk the market he already has by

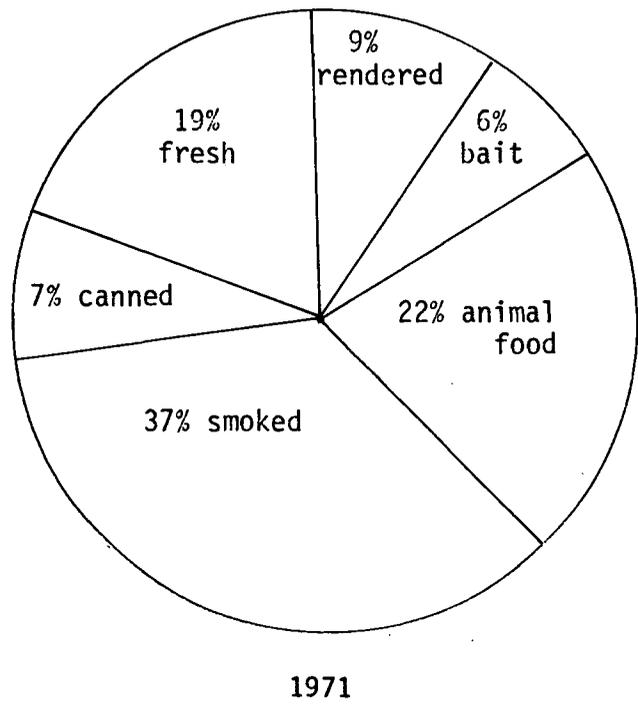
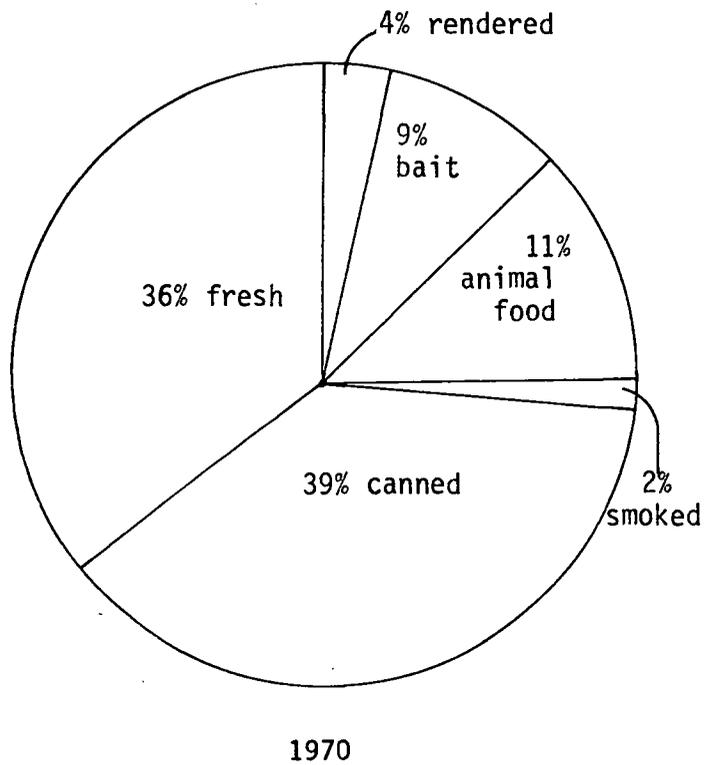
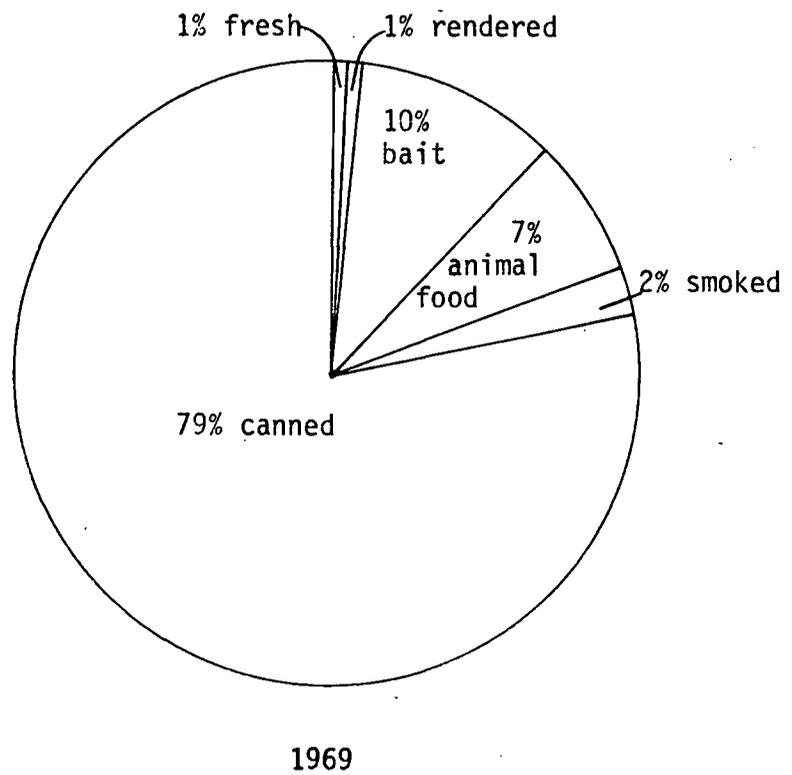
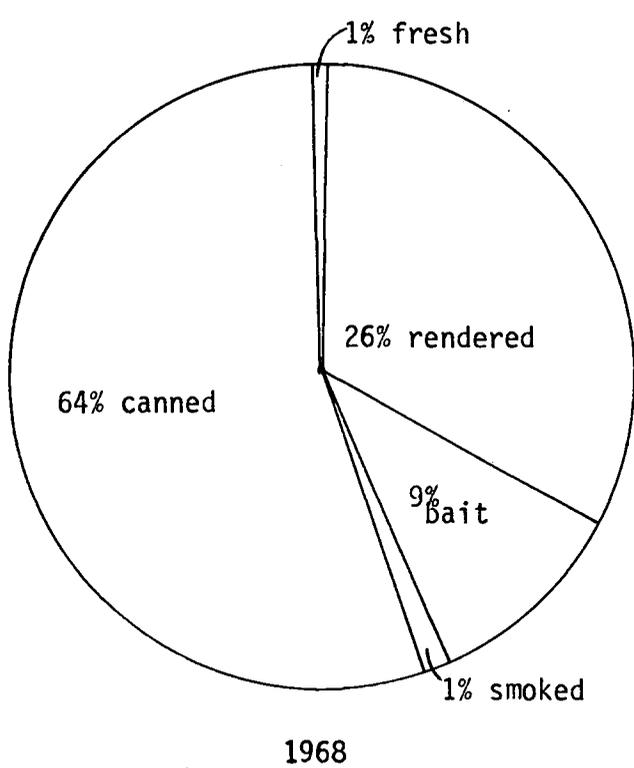


Figure 1. Processor Utilization of Salmon Purchased from FCO Hatcheries, 1968-71.

delivering poor quality fish.

Information in Table 5 indicates sizable out-of-state shipments have been made in each year included in the study. The percentages differ, but the sale of hatchery fish does appear to be an export (to other states and countries) business. The figures indicate that prior to 1971 the majority of the coho were shipped to distant states. In 1971 the coho were used in greater numbers on the west coast. Chinook have been used on the west coast to a larger degree than the coho. A comparison of the coho and chinook figures will indicate that this situation was changed in 1971. More distant national and some international export markets were reached by the chinook during 1971. Coho and chinook markets were altered somewhat in 1971, the first year of FCO grading for fish quality at the hatchery. Although the 1971 marketing found more coho used in the western region and more chinook in distant markets, the effect cannot be attributed to the FCO grading program. As previously indicated, each year brings a different mix of successful bidders and perhaps salmon of varying quality due to the timing of the run.

FCO and Buyer Practices

Complaints, whether well founded or not, about the disposal of hatchery salmon have caused both FCO and buyers to react. Hatchery salmon have been referred to in uncomplimentary terms. Reference is made to poor quality and improper handling practices. The result has been that some effort exists among buyers to conceal the origin of the salmon when being marketed. Buyers frequently will sell to a middleman rather than process the fish or sell them directly to a processor. Another practice is to mix hatchery salmon with the commercial catch. These practices are not illegal or dishonest *per se*. Buyers often feel they are required to handle some of the fish in this

Table 5. Markets for FCO Hatchery Sold Salmon, 1968-71

	1968	1969	1970	1971 ^{1/}
	<u>percent</u>	<u>percent</u>	<u>percent</u>	<u>percent</u>
Coho				
Oregon	25.2	.5	26.8	11.8
Wash.-Calif.	14.3	22.3	7.5	47.2
Other States	60.5	53.1	64.1	12.1
Exported	-	19.1	1.6	28.9
TOTAL	100.0	100.0	100.0	100.0
Chinook				
Oregon	37.3	12.1	19.6	4.4
Wash.-Calif.	49.0	12.6	13.6	9.1
Other States	13.7	75.3	61.3	33.9
Exported	-	-	.5	52.6
TOTAL	100.0	100.0	100.0	100.0
Combined				
Oregon	28.9	6.1	24.7	9.4
Wash.-Calif.	24.7	17.7	10.7	31.2
Other States	46.4	66.3	63.3	21.3
Exported	-	9.9	1.3	38.1
TOTAL	100.0	100.0	100.0	100.0

^{1/} Data through November, 1971.

manner because of derogatory comments made about hatchery salmon quality.

The grading system used by the FCO for the first time in 1971 was an attempt to distinguish the fish by quality. Figures in Table 6 indicate the poundage of fish placed in the three categories. To repeat, category 1 fish had no restrictions on use, category 2 were to be used for any purpose other than fresh or fresh frozen, and category 3 fish were suited only for non-human consumption. Only 54 percent of the fish classified as fit for the fresh or fresh frozen market were in fact utilized in that manner. An explanation may be that the fish arrive at the hatchery beginning in mid-September, a time when fresh markets have been supplied with troll-caught fish. Those fish graded by FCO as category 1 but not used in category 1 were probably utilized as category 2. This is the reason for more fish used as category 2 fish than the FCO placed in the category. A similar situation occurred in category 3. More fish were used as category 3 than classified in that manner: the additional fish probably came from those classified as category 2.

Table 6. Comparison of FCO Categories and Buyer's Actual Utilization, 1971^{1/}

Category	Sold by FCO	Buyer's Use	Buyer's Use as a Percent of lbs. in FCO Categories
	-lbs.-	-lbs.-	
1	220,496	119,378	54.1
2	287,552	350,227	121.8
3	247,808	286,251	115.5

^{1/} Immature salmon (jacks) have been omitted from the above figures.

The 1971 FCO practice of grading fish seems to have produced a break in the trend evident in Table 7. Prior to 1971 the use of returned hatchery fish for human consumption was running about 4.5 percent of commercial landings (see Table 7). Even though 1970 and 1971 were years of large commercial landings, the greatest split in the figures was experienced. During 1968, 1969 and 1970 the use of hatchery fish for satisfying human consumption increased. Then in 1971 the utilization dropped by nearly two percentage points from 4.7 to 2.98 percent.

Table 7. Human Consumption of FCO Hatchery Sold Salmon as Compared to Commercial Landings, 1968-71.

Year	Commercial Catch ^{1/}	Human Consumption of Surplus Hatchery Fish ^{2/}	Human Consumption of Surplus Hatchery Fish as a Percent of Commercial Catch
	-lbs.-	-lbs.-	
1968	9,990,635	418,918	4.19
1969	10,932,020	506,165	4.63
1970	19,624,008	921,805	4.70
1971	17,330,000	516,182	2.98

^{1/} For reasons of comparison it is assumed that all commercially caught salmon are used for human consumption.

^{2/} Determined by summing the figures for fresh, canned and smoked. Figure for 1971 is through November.

Summary

The sale of returned hatchery salmon has been a subject of interest to FCO personnel, processors, and commercial fishermen. Often discussed, and frequently hotly debated, this topic continues to hold a good deal of interest. This will continue to be the case in the near future. Interest will be even more intense, however, when fishermen receive low prices for their catch or when FCO adjusts the disposal program in response to suggestions. The information in this report has been prepared for use whenever the hatchery disposal issue is discussed or debated.

This report has been prepared in a manner that has allowed comparison of information about coho and chinook salmon. Also, comparisons of commercial and FCO hatchery salmon were made. In general, it was found that hatchery salmon do not all reach the human-use market. Some are used for crab bait, animal food, or are disposed of at rendering plants. The human-use markets utilized are similar to those for commercially landed salmon. Oregon is not a major market for commercial or hatchery salmon. Hatchery salmon marketed in Oregon are primarily used for non-human purposes; the salmon made available to people is mostly in smoked form.

One item worthy of summarization is the FCO program of grading fish for quality implemented for the first time in 1971. This appears to have had one significant effect and was one of the few easily identified trends in the study period: the slight percentage increase in human consumption of FCO fish as compared to that landed commercially. This trend existed until 1971 when a sizable drop in the percentage occurred. The decrease shown in Table 7 indicates relatively fewer salmon sold by the FCO were in direct competition with salmon caught by commercial fishermen.

Conclusions

The conclusions are not the important part of this report for two reasons. First, the study covered only four years, each characterized by different buyers. This fact makes "proving" an argument right or wrong extremely difficult. Second, the objective of the study was to develop and distribute information. The following conclusions are provided to stimulate your own thinking, not stifle it. Rather than eliminating debate and discussion, the conclusions are to be used on such occasions.

At the outset, the report noted three common concerns of people in the seafood industry about the sale of surplus hatchery salmon. They were:

"Salmon sold from hatcheries is of poor quality; this hurts our markets!"

"A public agency shouldn't be in the fish business!"

"Those returned hatchery fish are lowering the price of salmon caught by commercial fishermen!"

How can the information presented here help us to understand the questions raised by these concerns?

"Salmon sold from hatcheries is of poor quality; this hurts our markets!"

To be certain, many of the salmon are not on a par with commercially landed fish. This does not mean that all the fish are of poor quality. It does appear that some of the salmon in poor condition in the years prior to 1971 were used for human consumption. Evidence for this conclusion is found in Table 7. The FCO practice of categorization appears to have reduced the use of poor quality fish for human consumption. Prior to 1971 it was only considered to be unethical to use deteriorating fish in such a manner. Terms specified in the bid agreement prohibit the use of category 3 fish for human consumption. Judging from the practice of re-selling hatchery fish two or

more times before being mixed with commercial fish for processing, the quality complaint echoed in years past was valid.

"A public agency shouldn't be in the fish business!"

No economic information can be applied to this statement. The public is in the fish business, but only indirectly. Hatcheries are primarily intended to bolster commercial and sport landings and this will be their purpose in the future. More fish may continue to return than are needed. Thus, the public will have to be in the fish business. The Fish Commission of Oregon should continue the disposal program, study its effects, and continue its solicitation of industry suggestions for adjustment.

"Those returned hatchery fish are lowering the price of salmon caught by commercial fishermen!"

There are many factors that affect the price the fisherman receives for salmon. It cannot be stated conclusively that salmon sold from hatcheries have no effect on commercial prices. However, it is likely that if an effect exists, it probably is minimal. Several non-technical reasons exist for this conclusion. Table 7 indicates that the hatchery fish poundage used for human consumption has been less than 5 percent of commercial landings. It seems inaccurate to assume that this volume of hatchery fish could be responsible for lowering prices and that the other 95 percent of salmon marketed had no effect. The total effect of hatchery fish on prices is likely to be small.

Due to the procedure used by FCO, bidders do not know if they are successful until early August. This means that troll prices are not affected since the season is nearly over at that time. There is the remote possibility that troll prices in the following year could be affected if the hatchery salmon go into storage. The gillnetters in the Columbia appear most likely

to be affected if anyone is. The gillnetters may be voluntarily "tied-up" in an effort to obtain a certain price while some fish are being placed on the market by processors successful in the FCO bidding. This development depends on who the successful bidders are and where they are located. The price effect again, however, would be expected to be small.

One factor that could affect fisherman prices has been removed. Before the FCO began the grading system, the buyers were free to sell the fish in most any manner available. Salmon of poor quality may have been marketed. The person eating such salmon won't be a willing customer the next time salmon is offered. Salmon is sold as a prestige, highly desirable fish. Damage to this reputation results in lower prices or lower demand. Neither of these factors is helpful to the fisherman's effort to gain a certain price for salmon. The FCO grading program has been helpful in keeping the possibility of this situation to a minimum.